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TITLE Method for Production of Fluff Pulp

CITED PUBLICATIONS

SUMMARY:

The invention concerns a method for production of fluff pulp of the type obtained by digestion and delignification of wood raw material by means of digestion chemicals to produce pulp fibers, which are washed by being kept in aqueous suspension and dried for delivery in dry form. Alpha-cellulose in finely ground form is added to the aqueous suspension, in which the pulp fibers are present before drying, in order to settle on the surface of the pulp fibers and, in so doing, counteract the occurrence of hydrogen bonds between the fibers while they are being dewatered and dried.

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Technical area of the invention

The invention concerns a method for production of fluff pulp of the type obtained by digestion and delignification of wood raw material by means of cooking chemicals to obtain pulp fibers that are washed by being kept in aqueous suspension and dried, and for delivery in dry form.

Background of the invention

Fluff pulp is generally produced by dewatering the delignified and washed fibers by being taken up on a screen and dried by passing through a pressing and drying unit, whereupon the fiber web so obtained is delivered in sheet or roll form from the pulp mill to different consumers or so-called converters. Unlike paper, such fiber webs have significant basis weight (normally to 500 – 1,000 g/m^2) and the requirement for surface smoothness, strength, etc. is relatively moderate. Converters, in turn, defiber the delivered fiber webs to form a fluff with a bulky structure and high water absorption capacity, which is used as an absorption medium in different types of sanitary and incontinence products, like diapers, bandages, etc.

Sulfite pulp was originally used primarily to produce fluff, and then mostly bleached sulfite pulp with medium-high alpha-cellulose content, which was relatively easily defibered as a result of the lesser tendency of alpha-cellulose (in comparison with hemicellulose) to form hydrogen bonds between the fibers during pulp drying. The mechanical equipment used for defibering of bleached sulfite fluff pulp was designed for this purpose with fairly moderate power capacity, i.e., it operated with comparatively low power consumption. This low-capacity equipment established itself in its day as suitable for both large and small converter units.

However, bleached sulfite pulp has a number of drawbacks in comparison with bleached kraft pulp, for example: high resin content, which entails longer absorption times and a deterioration in aging and storage properties, owing to the fact that the resin migrates from the fiber surfaces and hydrophobizes the fibers; poorer fiber rigidity, which entails poorer bulk in the fluff, as well as poorer liquid retention capacity during loading of the fluff material; and the circumstance that pulp with high alpha-cellulose content becomes costly to produce, owing to the high bleaching costs and low yield.

The aforementioned drawbacks in sulfite pulp, in comparison with kraft pulp, mean that mass producers tried different possibilities to use hemicellulose-rich kraft pulp for fluff in practical production. In an attempt to defiber such pulp in the existing conventional equipment, however, it was shown that kraft pulp required much higher energy consumption than sulfite pulp, and the result most often was that the electric motors incorporated in the equipment stopped, because of overload, and when defibering of the kraft fluff pulp was considered successful, the produced fluff was scorched, owing to overheating in the equipment. Developments in the field were therefore geared toward finding suitable chemicals to reduce

hydrogen bonding in the contact surfaces between the fibers of the fluff pulp. This development was successful and, in the period 1965-1975, a number of so-called debonding agents of the cationic type were developed, with which it was possible to reduce power consumption during defibering of kraft pulp to a level that made dry defibering of the pulp possible with the available equipment; something which, in practice, meant that the greater part of all fluff came to be produced from kraft pulp.

However, following this development period, it was noted that, if one could defiber fully bleached kraft fluff pulp that did not contain any debonding chemicals, the pulp's properties could be improved with respect to absorption rate and liquid distribution. In addition, a desire for fluff products, like diapers, etc., without chemical additives developed from the consumer sector. A trend developed to design defibering and converter equipment with high enough capacity, so that mostly chemical-free kraft pulp could be defibered. The situation today has developed primarily so that essentially the large converter units entirely employ untreated or chemical-free fluff pulp, which is defibered in high-capacity equipment, whereas the small-and medium-sized units most often have low-capacity equipment for defibering of fluff pulp, to which chemicals of different types that counteract fiber bonding are added.

Brief description of the idea of the invention

The present invention seeks to create a fluff pulp that can be produced without any debonding chemicals with the task of counteracting fiber bonding, and nevertheless is so easy to dry defiber that equipment with low power consumption is suitable for the purpose. According to the characteristics of the invention, this is achieved in that alpha-cellulose is added in finely ground form, to the aqueous suspension, in which the pulp fibers are present before drying, with the task of settling on the surface of the pulp fibers and, in so doing, counteracting the occurrence of hydrogen bonds between the fibers while it is being dewatered and dried.

Owing to the fact that the added alpha-cellulose is present in finely ground form, its effective surface is increased several-fold, in which case the individual alpha-cellulose particles can settle in large amounts on each individual pulp fiber in the suspension. When the fibers are dewatered by being taken up on a screen and fed to the press and drying parts, the tendency toward hydrogen bonds between the fibers is therefore counteracted, owing to the fact that the alpha-cellulose particles prevent direct surface contact between fibers.

In a laboratory experiment, a sheet was produced from a kraft pulp treated as follows. Finely ground high alpha-cellulose (alpha content = 92.5%) was added to a fiber suspension in an amount corresponding to 10 kg/tonne of pulp, in which the cellulose was finely ground to a particle size in the range 0.001 – 0.1 mm. Charging occurred without any chemical addition at all. The fibers were then dewatered and a sheet produced by pressing and drying with a basis weight of about 800 g/m^2, which was then dry defibered by scarification in a shredder. It was

found that the required defibering energy was 150 kJ/kg, in comparison with about 400 kJ/kg for untreated kraft pulp of the same type (i.e., a kraft pulp without alpha-cellulose addition). The absorption capacity according to SCAN increased from 9 g H_2O/g of fluff to 10 g H_2O/g of fluff, i.e., an increase by more than 10%.

During practical use, the finely ground alpha-cellulose should be added in an amount of 0.05 – 5, suitably 0.5 – 2, or preferably around 1% of the weight amount of the pulp fibers in the bone-dry state. The alpha-cellulose suitably should be ground to a fineness, at which at least 90% has a particle size or length in the range 0.0001 – 0.1 mm, and preferably an average length of around 0.01 mm.

Although the invention is considered suitable primarily for kraft pulp, it is also conceivable to apply it to the production of other types of fluff pulps, like soda pulp and modern sulfite pulps, digested on a soluble basis, or mixtures of different types of pulp with the common feature that they have relatively high hemicellulose content (10 – 20% hemicellulose) and can therefore be produced in high yield. The alpha-cellulose employed can advantageously be represented by viscose pulp, i.e., a pulp cooked and bleached to obtain an alpha-cellulose content of more than 90%. Other types of fibers with high alpha-cellulose content, like cotton fibers, can also be used as raw material for the ground alpha-cellulose flour.

According to one conceivable variant of the invention, the finely ground alpha-cellulose can be added to the fiber suspension, together with small amounts of a suitable retention agent with the task of improving adhesion of the alpha-cellulose particles to the pulp fibers. CARTAFIX FF can be used here as retention agent, for example, in amount of about 1 wt.%, referred to the amount of fluff pulp. In this case, the tendency toward dust formation in conjunction with defibering of the treated pulp is reduced.

CLAIMS

1. Method for production of fluff pulp of the type produced by digestion and delignification of wood raw material by means of cooking chemicals to obtain pulp fibers, which are washed by being kept in aqueous suspension and dried, and for delivery in dry form, characterized by the fact that alpha-cellulose is added to the aqueous suspension, in which the pulp fibers are present before drying, in finely ground form with the task of settling on the surface of the pulp fibers and, in so doing, counteracting the occurrence of hydrogen bonds between the fibers while they are dewatered and dried.

2. Method according to Claim 1, characterized by the fact that the finely ground alpha-cellulose is added in an amount of 0.05 – 5, suitably 0.5 – 2, or preferably about 1% of the weight amount of pulp fibers.

3. Method according to Claim 1 or 2, characterized by the fact that the alpha-cellulose is ground to a fineness, at which at least 90% of it has a particle size or length in the range 0.0001 – 0.1 mm, and preferably an average length of about 0.01 mm.

4. Method according to any of the preceding Claims, characterized by the fact that the finely ground alpha-cellulose is added to the fiber suspension, together with a retention agent, with the task of improving adhesion of the alpha-cellulose particles to the pulp fibers.

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TRANSLATIONS

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